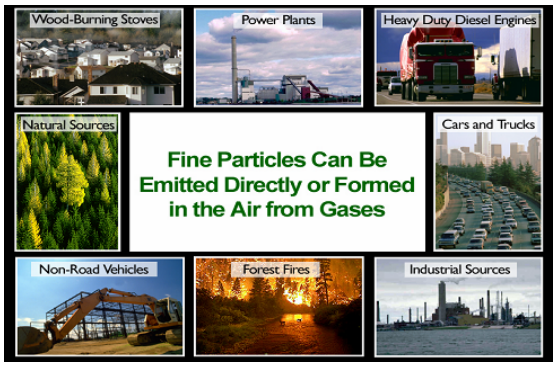
Fine Particles

What are they?

Particulate Matter is one of six criteria pollutants addressed by the Clean Air Act. These pollutants have been identified as being particularly harmful to humans and the environment. National Health Standards have been developed for the criteria pollutants and are used as measurements of air quality. Particulate matter, or PM, is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. Some particles are large or dark enough to be seen as soot or smoke. Others are so small that individually they can only be detected with an electron microscope. Particulate matter is categorized as "fine" particles of 2.5 microns or less in diameter or "coarse" particles between 2.5 and 10 microns in diameter. (In comparison, a human hair is about 70 microns in diameter.) Fine particles can be suspended in the air for long periods of time.



Where do they come from?

Fine particles come from many different sources including industrial and residential combustion activities and vehicle exhaust, so their composition varies widely. Some particles are emitted directly into the air, such as from cars, trucks, buses, factories, constructions sites, tilled fields, unpaved roads, stone crushing, and wood burning.

Other particles are formed in the air from the chemical change of gases. They are indirectly formed when gases from burning fuels react with sunlight and water vapor. These gases come from fuel combustion in motor vehicles, at power plants, and in other industrial processes.

Why Should I be Concerned?

Fine Particulate Matter

- is associated with serious health effects.
- is associated with increased hospital admissions and emergency room visits for people with heart and lung diseases.
- is associated with work and school absences.
- is the major source of haze that reduces visibility in many parts of the United States, including our National Parks.
- settles on soil and water and harms the environment by changing the nutrient and chemical balance.
- causes erosion and staining of structures, including culturally important objects such as monuments and statues.

AIR QUALITY INDEX (AQI) for Particle Pollution		
Index Values	Levels of Health Concern	Cautionary Statements
0 to 50	Good	None
51 to 100	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion.
101 to 150	Unhealthy for Sensitive Groups	People with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion.
151 to 200	Unhealthy	People with heart of lung disease, older adults, and children should avoid prolonged or heavy exertion. Everyone else should reduce prolonged or heavy exertion.
201 to 300	Very unhealthy	People with heart of lung disease, older adults, and children should avoid all physical activity outdoors. Everyone else should avoid prolonged or heavy exertion.
301 to 500	Hazardous	People with heart or lung disease, older adults, and children should remain indoors and keep activity levels low. Everyone else should avoid all physical activity outdoors.

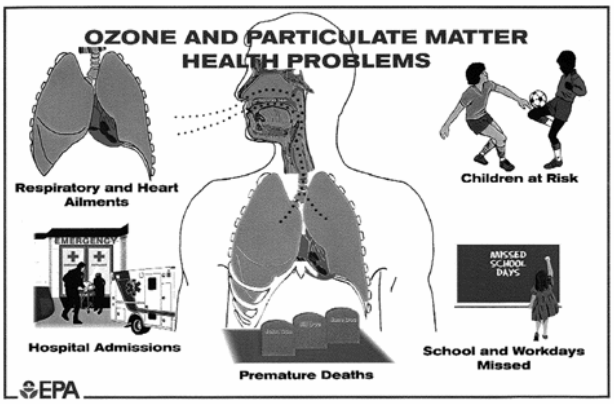
You can learn about your air quality on a given day by looking at the Air Quality Index. The purpose of the AQI is to help you understand what local air quality means to your health. Each category corresponds to a different level of health concern. The higher the AQI value, the greater the level of air pollution and the greater the health concern. The Air Quality Index is published on U.S. EPA's website at http://airnow.gov and in some newspapers.

How does particulate matter affect health?

Children, the elderly, and individuals with cardiovascular disease or lung diseases such as emphysema and asthma are especially vulnerable to particulate matter.

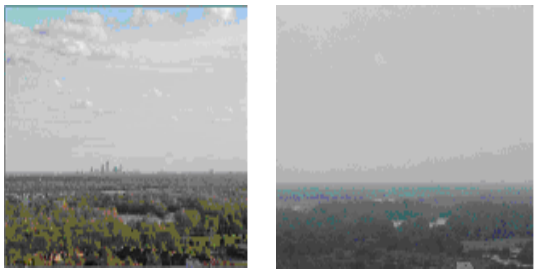
Fine particles can penetrate into the sensitive regions of the respiratory tract. Health problems associated with particulate matter can get worse for sensitive people if they are exposed to high levels of fine particles for several days in a row. Many scientific studies have linked breathing particulate matter to a series of significant health problems, including:

- Aggravated asthma
- Increases in respiratory symptoms like wheezing, coughing and difficult or painful breathing
- Chronic bronchitis
- Decreased lung function
- Premature death



How do fine particles affect the environment?

Fine Particles Reduce Visibility



Example: Indianapolis in the Summer of 2003
Left: a clear day: PM 2.5 < 5µg/m^3
Right: a hazy day: PM 2.5 > ~ 30 µg/m^3

Visibility impairment

Particulate matter is the major cause of reduced visibility (haze) in parts of the United States, including many of our national parks.

Aesthetic damage

Soot, a type of particulate matter, stains and damages stone and other materials, including culturally important objects such as monuments and statues.

Atmospheric deposition

Particles can be carried over long distances by wind and then settle on ground or water. The effects of this settling include:

- Making lakes and streams acidic
- Changing the nutrient balance in coastal waters and large river basins
- Damaging sensitive forests and farm crops

What can I do to reduce particulate matter?

- Avoid using gas powered lawn and garden equipment.
- Drive slowly on unpaved roads and other dirt surfaces.
- Compost leaves, twigs and other yard waste instead of burning them.
- Consider using gas logs or burn only dry, seasoned wood in your fireplace.
- Keep your car, boat and other engines properly tuned, and avoid engines that smoke.
- Car pool, use public transportation, bike or walk when possible.
- Conserve electricity by reducing the amount of energy you use.

For More Information:

- IDEM information concerning the fine particles standard
- Smog Watch
- How Particulate Matter Affects the Way We Live and Breathe EXIT IDEM
- What Are the Six Common Air Pollutants? EXIT IDEM
- Air Quality Index EXIT IDEM

Publications

- Particle Pollution and Your Health EXIT IDEM

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